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TITLE: The temperature dependence of absorption by thin layers of Ga_2Te_3

SOURCE: Kishinev. Universitet. Uchenyye zapiski. v. 49, 1961, 119-122

TEXT: In order to obtain data on the impurity energy spectrum, the carrier concentration and the effective mass of Ga_2Te_3 films, the temperature dependence of the forbidden-band width ΔE was determined from measurement of the absorption spectrum. In most cases, $\Delta E = \Delta E_0 - \alpha T$, the position of the electron levels being governed by the thermal lattice distortion and by the interaction between electrons and thermal lattice vibrations. The films were produced by evaporating crystalline Ga_2Te_3 in vacuo ($\approx 10^{-5}$ mm Hg) and condensing it onto glass backings at various temperatures. For all specimens the spectral distribution of the optical density $\ln(I_o/I)$ was measured between -183 and +150°C; I_o and I being the

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intensities of incident and transmitted light respectively. The curves $K=f(\lambda)$ drop monotonically between 6000 and 9300 Å; $K = \ln((I_o - I_{refl})/I)/d$ is the absorption coefficient, I_{refl} is the intensity reflected from a layer of thickness d. The curves depend weakly on temperature and on the initial state of the Ga_2Te_3; with rising temperature they shift somewhat towards greater wavelengths. This shift is due to a change in forbidden-band width. The temperature coefficient of this change is $(4 - 6)\cdot 10^{-4}$ ev/deg, so that $\Delta E = \Delta E_0 - 5\cdot 10^{-4} T$, where ΔE_0 is the forbidden-band width determined from the temperature dependence of the specific electric conductivity. There are 4 figures.

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